MICROWAVE EME FROM HAWAII

A THREE-YEAR LEARNING EXPERIENCE OF MICROWAVE EME FUN

2024 INTERNATIONAL EME CONFERENCE - TRENTON, NJ

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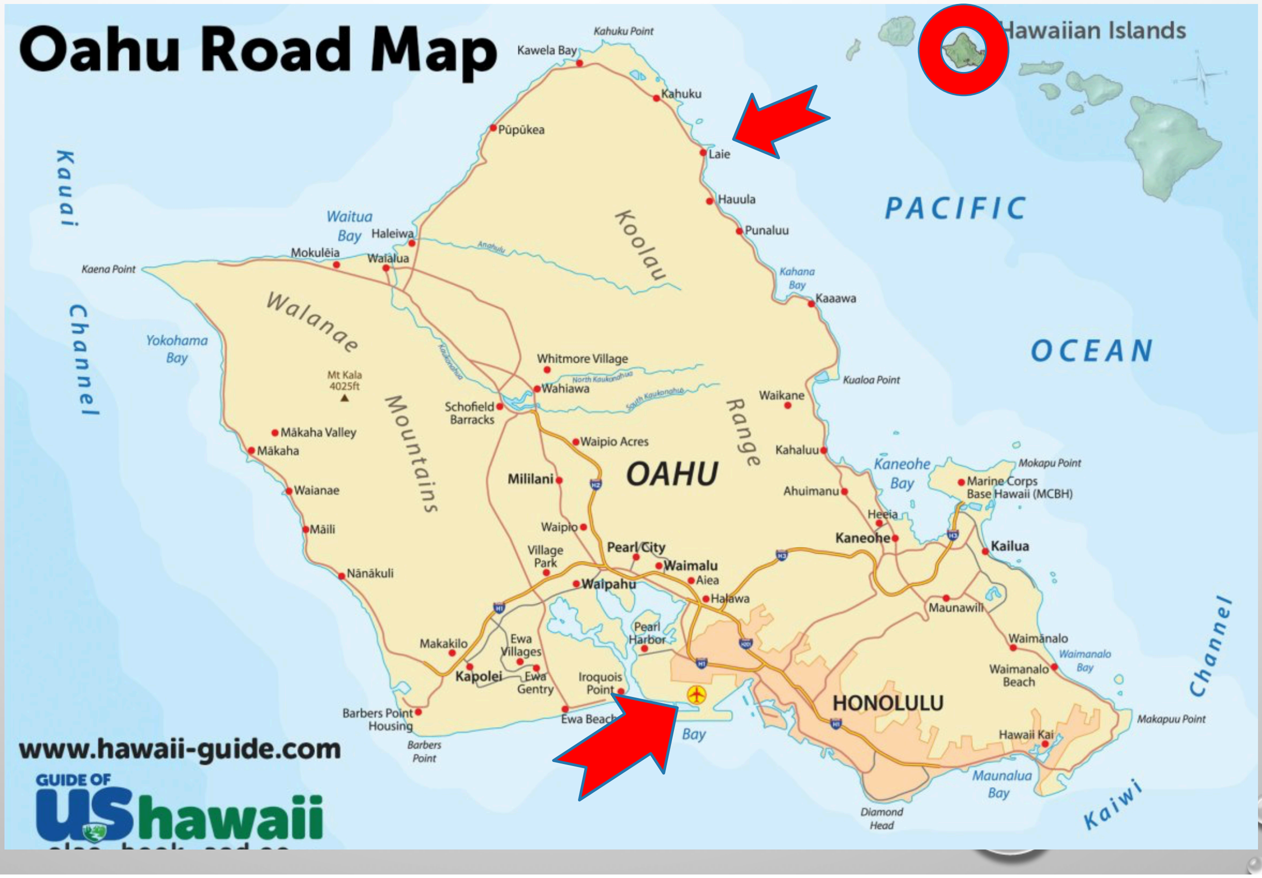
WHY HAWAII?

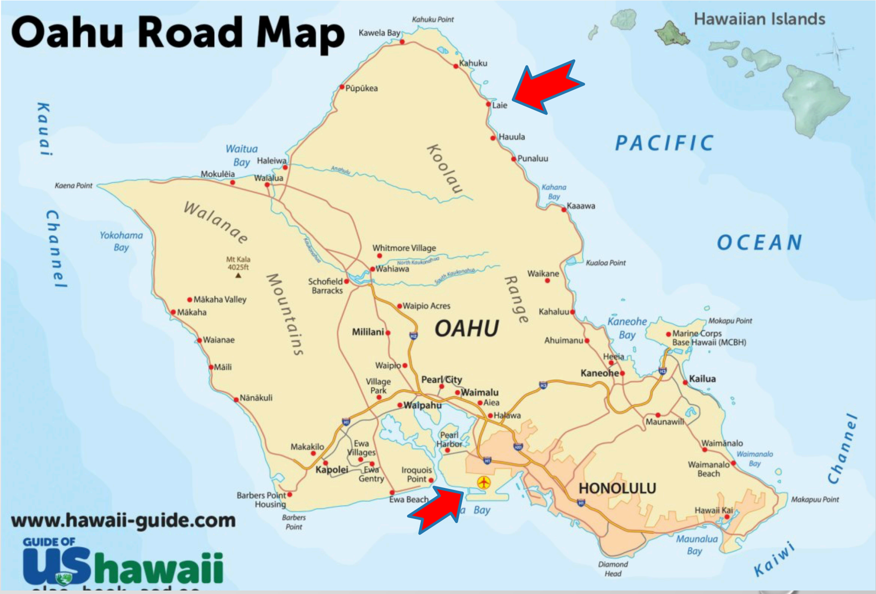
- I had never done a Dxpedition and it would be a challenge!
- Equipment was now available to allow for lighter weight portable use (dish and amplifiers)
- I had traveled to Oahu several times and dreamed about working stations from there
- Had a ham friendly area to operate from
- XYL said “sure”. GAME ON! (Thanks Vicki!)

WHERE IN HAWAII

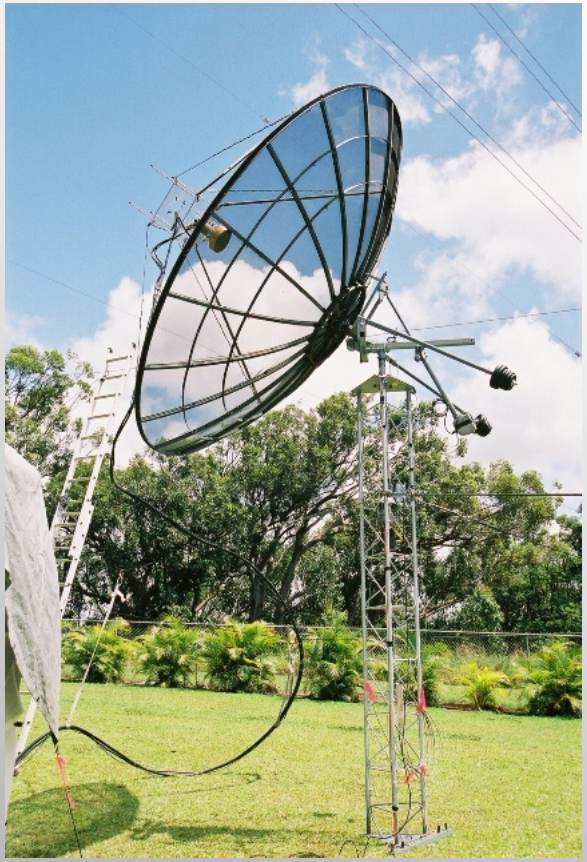


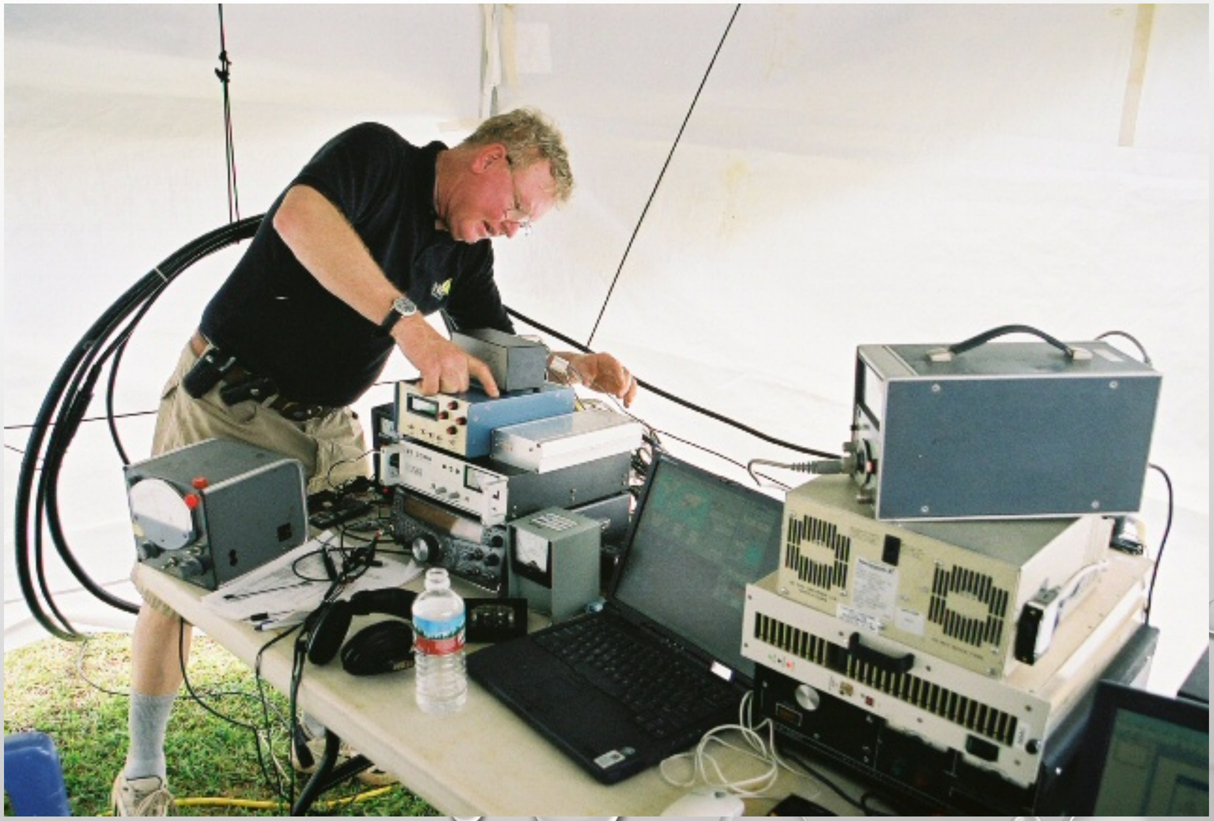
WHERE IN HAWAII

- **Oahu**
  - Easy to get to (6-hour direct flight from PHX)
  - Familiar
- **West side of the island**
  - MR over ocean (good)
  - MS blocked by Ko'olau mountains & house (bad)
  - Know owner of property and is ham friendly (good)
  - More wind (bad)
- **East side of the island**
  - MR needs 30ish degrees due to the Wai'anae mountains (bad)
  - Looking over the entire island (noise) (bad)
  - MS over ocean (good)
  - MUCH more expensive (very bad)

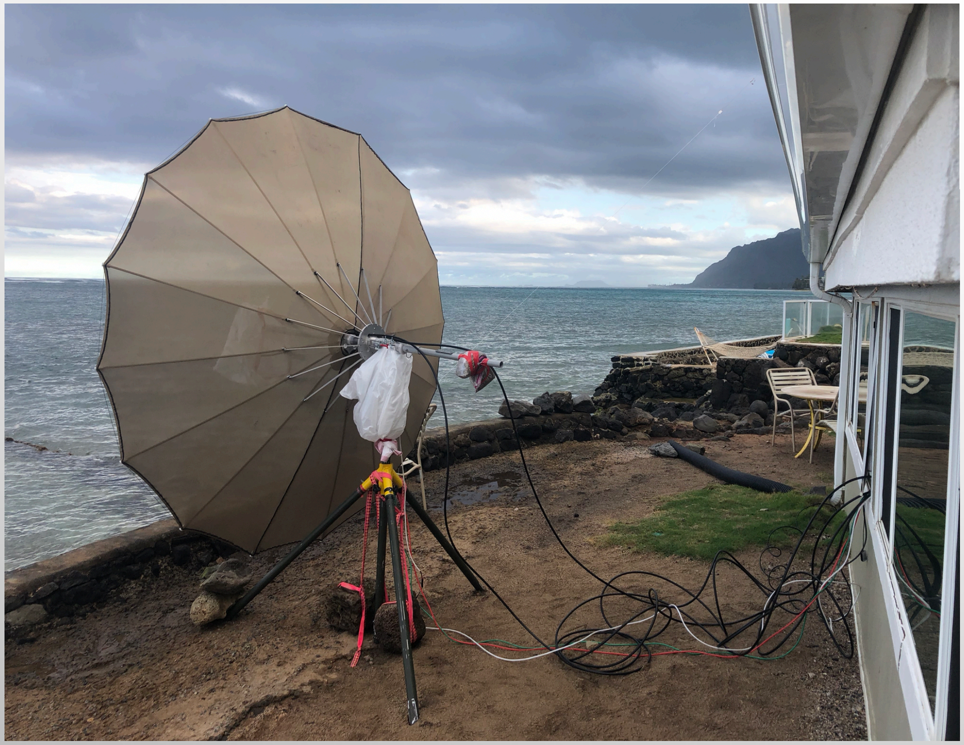


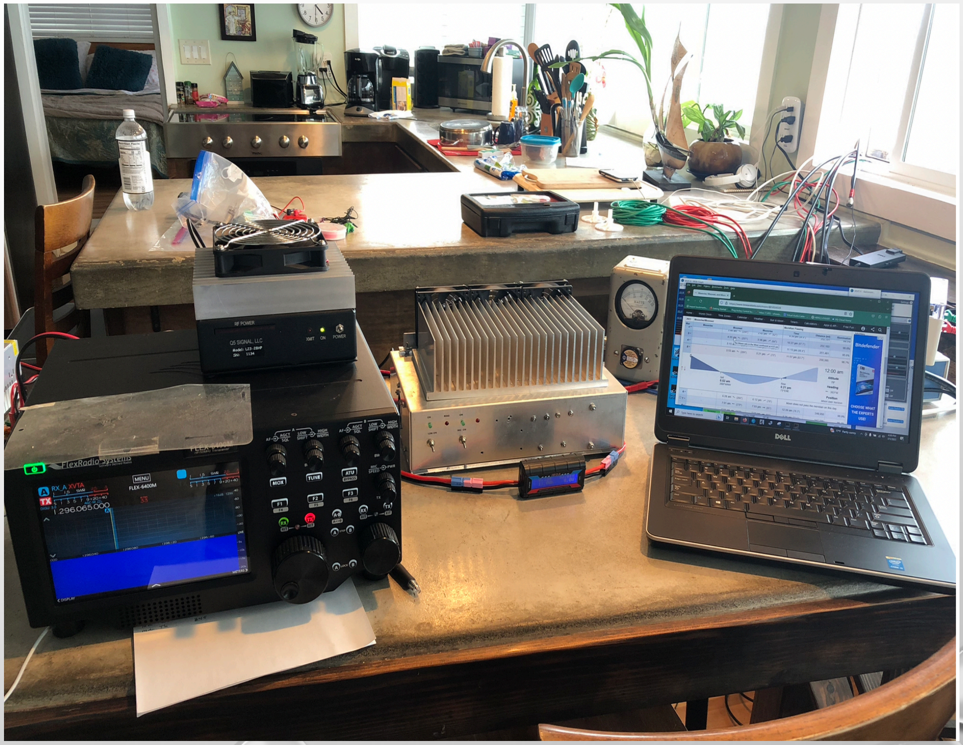
K0WY (AT KH6YY) DISH AND GEAR, 2007 (23/13CM)





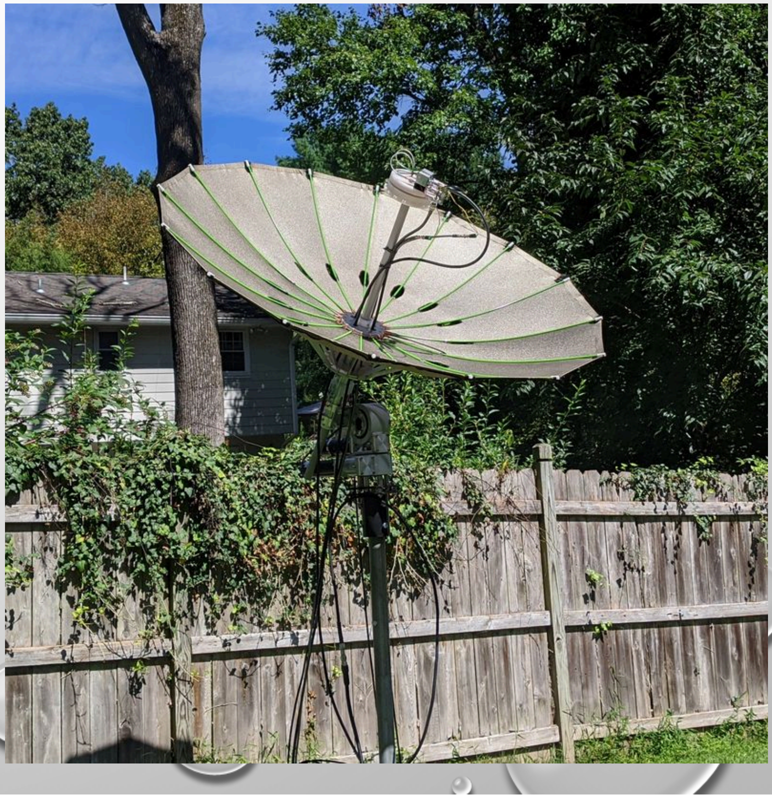
N1V DISH AND GEAR, 2023 (1296/902) (YEAR 2)

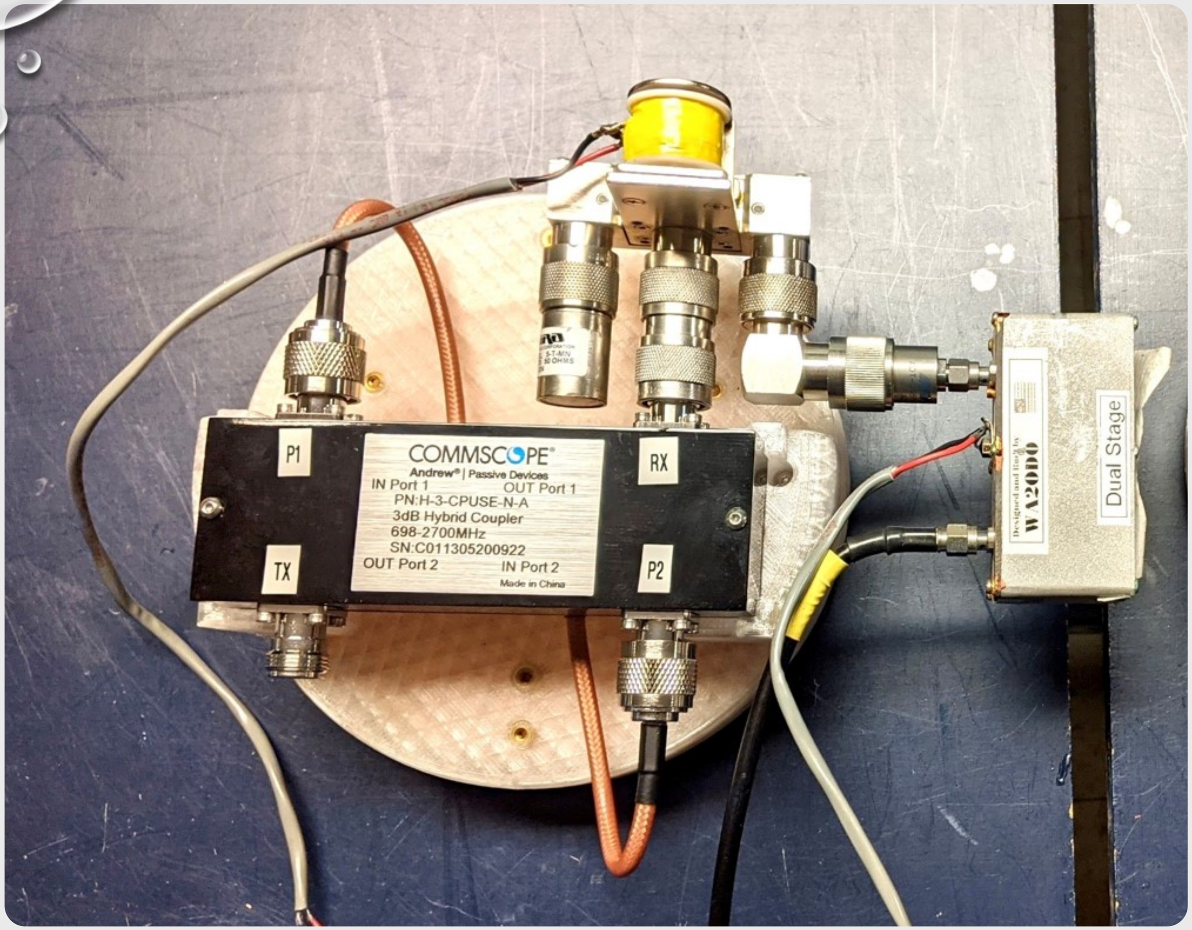




THE DISH

- Paul, W2HRO started working on a folding dish design during the COVID lockdown.
- Light weight, portable design
- Started selling them in 2021
- .38 f/D ≈ 26dB gain on 1296 MHz (2.4m)
- Weight is under 20 pounds!
- 3D printed feeds for 902, 1296, 2304 MHz
- EXTREMELY POPULAR IN THE USA!



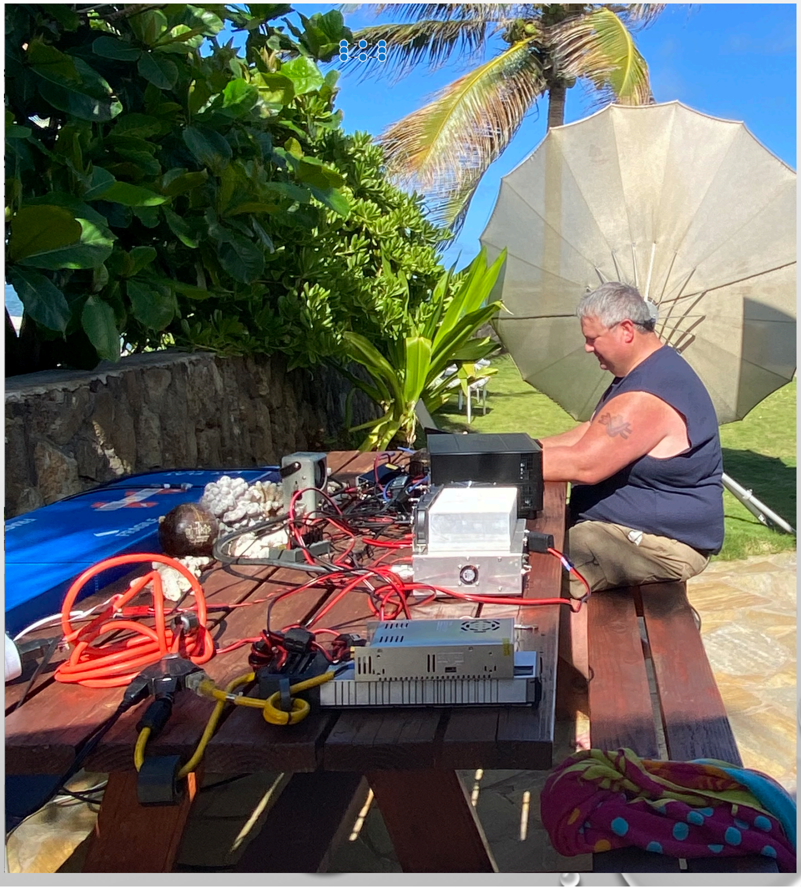


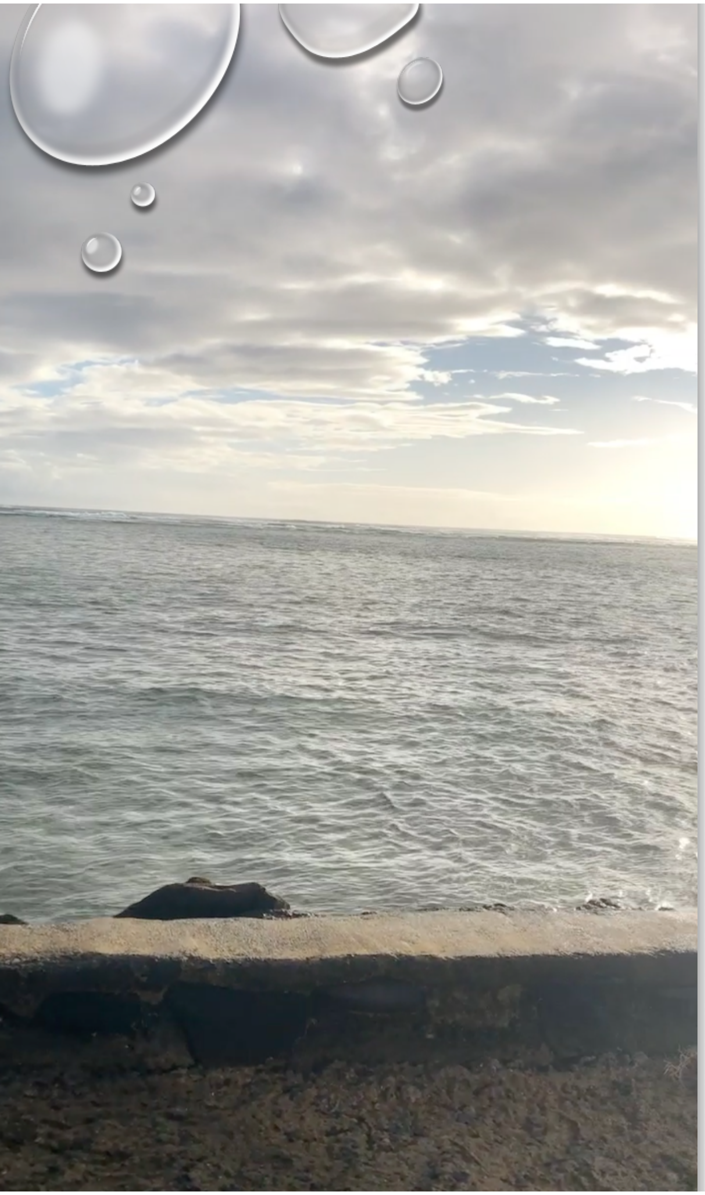
3DB HYBRID COUPLER MAKES THE MAGIC HAPPEN

- Commscope 3dB Hybrid Combiner and
  custom length cables
- Allows for circular polarization
- TX and RX ports
- Relay, DL, and preamp attached at RX port
- 902/1296/2304 feeds

OPERATING POSITION (YEAR 1)

- Outside operating table - no room inside location.
- First pass was at 3 PM, next day 4, next day 5pm, etc.
- Power from inside apartment, extension cord out the sliding door.
- Homeowners' main door was 6’ behind me.
- Yes, I was wearing SPF 50.
- When it rained, I had to shut down and cover everything with a tarp.



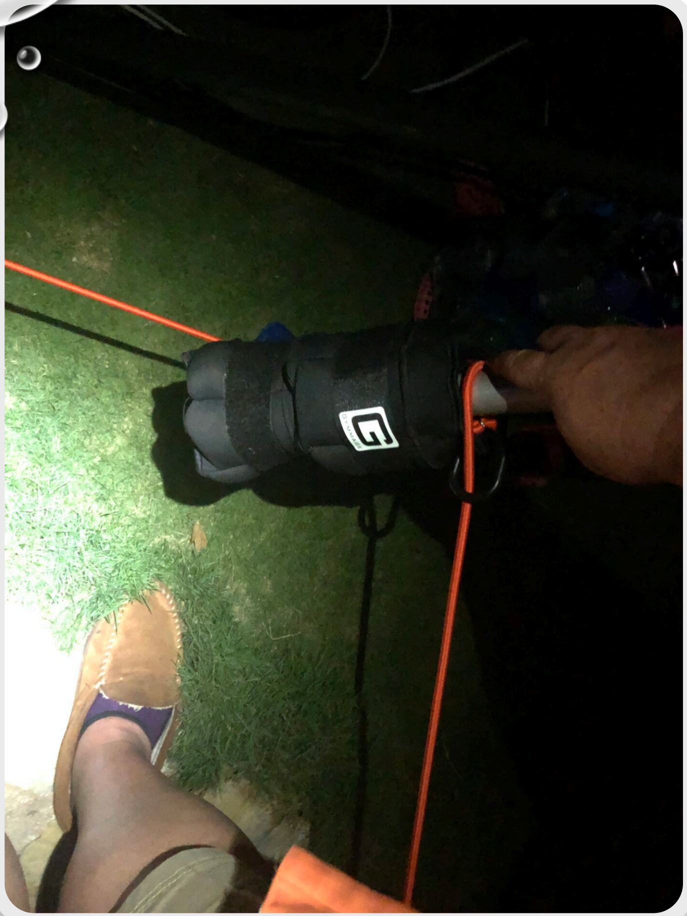


THE VIEW OF THE MOON (YEAR 2&3)

- Limited visual moon year 2, no visual moon year 3.
- Used sun noise to peak dish aiming
- Nothing between dish and moon but ocean
- Could start to hear stations at -1 degree
- Completed with some stations in first 2 degrees of the pass

OPERATING POSITION (YEAR 2/3)

- Two houses down from year 1.
- Took over the kitchen table
- DRY (Can operate in rain)
- Plenty of room
- passed cable through sliding window
- Could watch dish thru window
- Comfortable

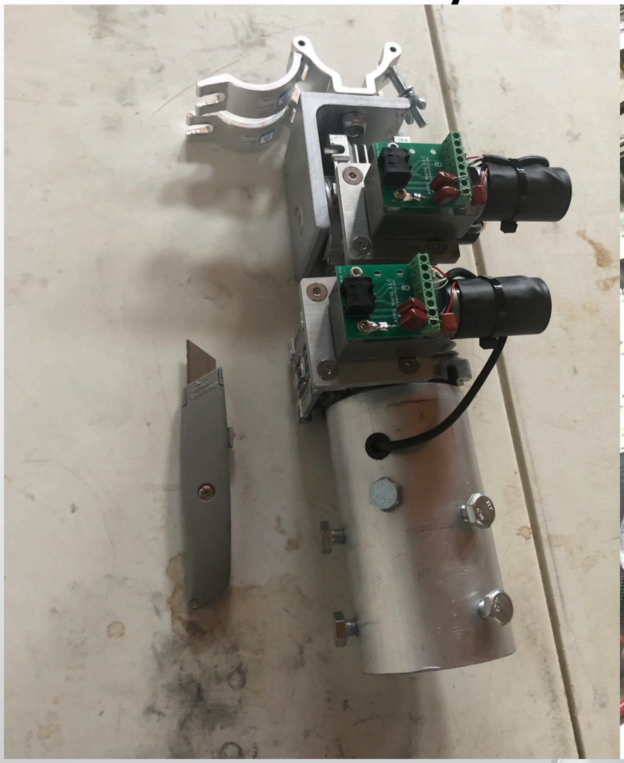


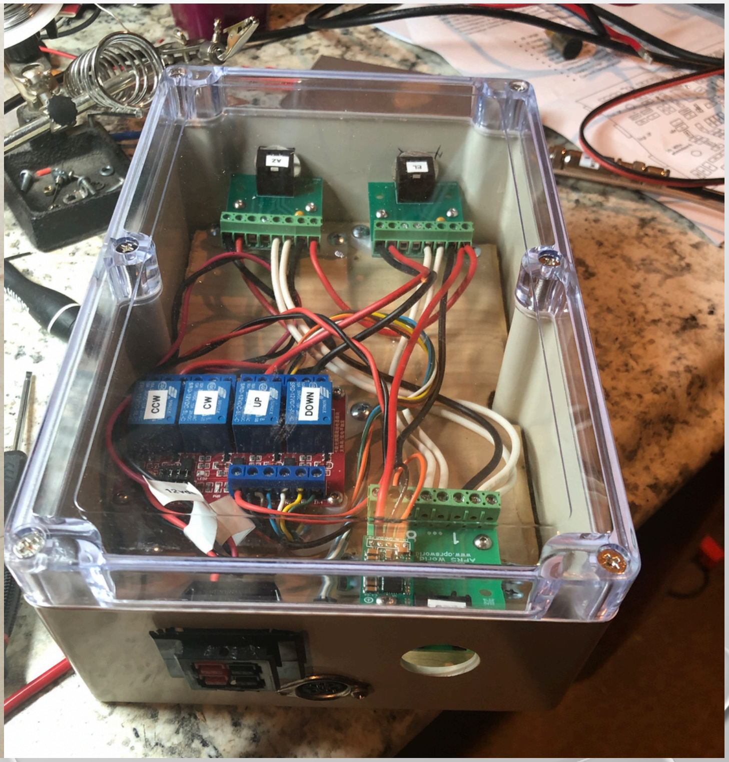
ROTOR CONTROL (YEAR 1)

- No rotor (what was I thinking??)
- Hand aiming (worked fine in AZ ((NO WIND)))
- In the wind I had to hold the counterweight arm for each of the 52 second transmit and receive Q65 cycles
- Then run back to the computer and see what decoded or advanced then back to the dish

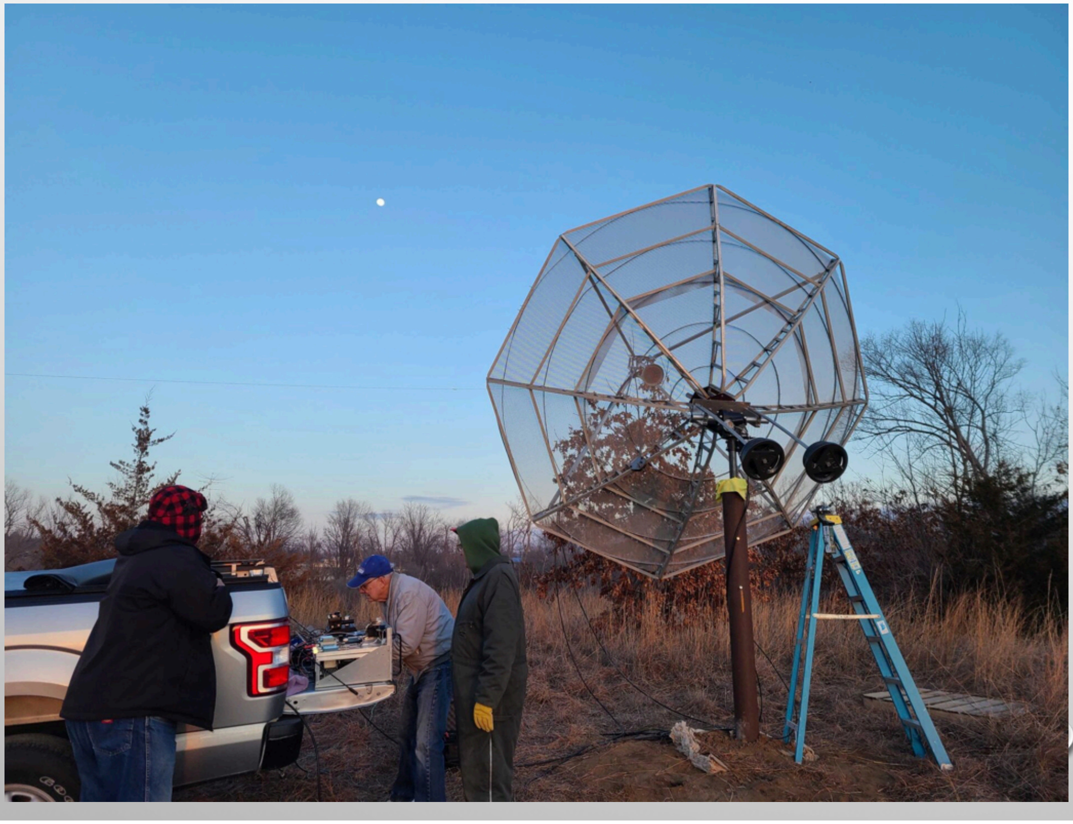
KEEPING ON THE MOON – ROTOR CONTROL! (2ND/ 3RD YEAR)

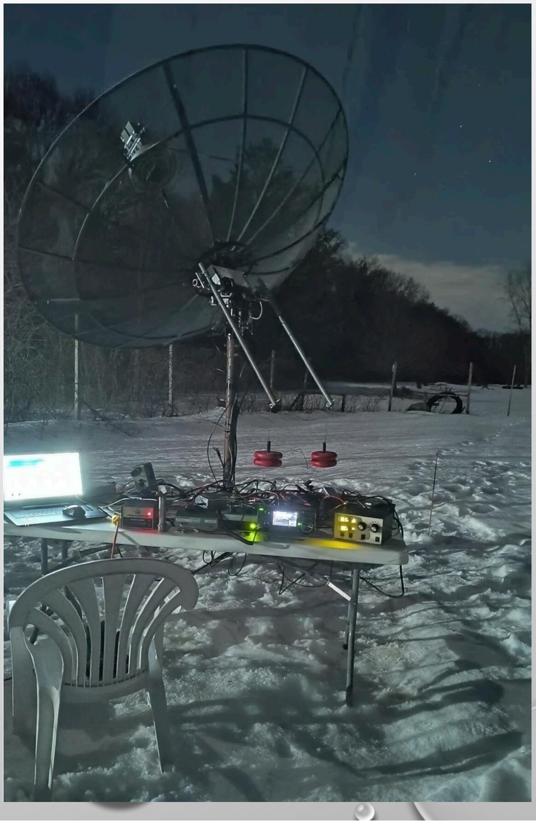
- Bleeding edge tech
- 3rd SL-1 rotor ever produced
- Custom interface board
- Tested for 2 months at home
- W2DZR controller interface
- Small and light for travel!





EFFORTS TO WORK N1V IN THE US





STATIONS WORKED YEAR 1 (1296/902)

STATIONS WORKED Q65 60C

HB9Q (-13), DG5CST (-15), NC1I (-26), OK1KIR (-23), DK4RC (-21), OK2DL (-22) DF3RU(-23), OK1DFC (-24)
PA3DZL (-24) *1ST EVER 23CM QSO FROM KH6 TO THE NETHERLANDS*
G4CCH (-20), W5LUA (-17), IQ2DB (-23)
OM4XA (-27), *1ST EVER 23CM QSO FROM KH6 TO SLOVAK REPUBLIC*
IK1FJI (-29), DL7UDA (-21)
OH2DG (-20) *1ST EVER 23CM QSO FROM KH6 TO FINLAND*
ON4AOI (-27) *1ST EVER 23CM QSO FROM KH6 TO BELGIUM*
DG0FE (-26), PA0BAT (-24)
ES3RF (-23), *1ST EVER 23CM QSO FROM KH6 TO ESTONIA*
UA3PTW (-23), DL6SH (-23), K2UYH (-24), OK1DFC (-14), SM5DGX (-15),
YO2LAM (-18) *1ST EVER 23CM QSO FROM KH6 TO ROMANIA*
K5DOG (-22), PA3FXB (-29), WA3QGQ (-24)

STATIONS WORKED: Q65 120D
W2HRO (-25), K6VHF (-28), KA1GT (-28), VE6TA (-21), KB2SA (-26), N5BF (-28), JA6AHB (-28) K3WM (-22), PA9RX (-32), DL4DTU (-26), N7GP (-30)

Stations worked on 902
first three QSOS EVER!!

- W5LUA *Fist KH6 to USA*
- VE6TA *First KH6 to VE*
- KL6M *First KH6 to AK*

STATIONS WORKED YEAR 2

STATIONS WORKED Q65 60C

K5QE EM31 Q65 -22 RCVD: -19 #50 FOR 1296 WAS
K7EME DM42 Q65 -31 RCVD: -23
PA0PLY JO32 Q65 -22 RCVD: -20 (1 DEGREE OF MOON ON HIS END)
W7JW Q65 -25 RCVD: -22 #50 FOR 1296 WAS
N9HF Q65 -23 RCVD: -22
EA8DBM IL18 Q65 -22 RCVD: -22
N9LHS Q65 -22 RCVD: -22
N0LNO Q65 SENT: -21 RCVD: -20
AC0RA Q65 SENT: -21 RCVD: -20
WH6A Q65 SENT: -23 RCVD: -22
W5GLD EM15 Q65 SENT: -21 RCVD: -21
KD5FZX EM12 SENT: -15 RCVD: -15
W6TCP CM97 Q65 SENT: -27 RCVD: -22
KB2SA Q65 SENT: -21 RCVD: -22
VE6TA DO33 Q65 SENT: -18 RCVD: -15
KB2SA Q65 **30D!** SENT: -20 RCVD: -23

W7JW Q65 **30D!** Sent: -24 Rcvd: -22
SM6CKU JO67 Q65 Sent: -15 Rcvd: -15
W2ZQ FN20 Q65 Sent: -24 Rcvd: -19
IK3COJ Q65 Sent: -22 Rcvd: -15
DK3WG JO72 Q65 Sent: -23 Rcvd: -21 #50 for 1296 WAS
W5AFY Q65 Sent: -24 Rcvd: -19
N0CTR EN26 Q65 Sent: -20 Rcvd: -20
W5LUA EM13 Q65 Sent: -18 Rcvd: -15
AA6I Q65 Sent: -24 Rcvd: -24
N5BF DM04 Q65 Sent: -24 Rcvd: -22
K5QE EM31 Q65 Sent: -19 Rcvd: -20
K8ZR EN91 Q65 Sent: -25 Rcvd: -20
N0AKC EN44 Q65 Sent: -24 Rcvd: -25
KB2SA Q65 Sent: -20 Rcvd: -20
VK2JDS QF46 MFSK Q65 Sent: -18 Rcvd: -18
OK1IL JN69 Q65 Sent: -25 Rcvd: -27 #50 WAS 1296
DG0FE JO62 Q65 Sent: -18 Rcvd: -20

STATIONS WORKED YEAR 2 (CONTINUED)

Stations worked 1296 Q65 60C (continued)

IQ2DB JN45 Q65 Sent: -20 Rcvd: -26
KA1GT Q65 Sent: -20 Rcvd: -19
VE3NXK FN05 Q65 Sent: -27 Rcvd: -24
VE3KRP EN58 Q65 Sent: -24 Rcvd: -18
N5TM EL29 Q65 Sent: -25 Rcvd: -23

902 EME LIST
AC0RA EN42 Q65 Sent: -23 Rcvd: -24 1st IA to HI
K0DAS EN42 Q65 Sent: -23 Rcvd: -24
KC0TYD EN42 Q65 Sent: -25 Rcvd: -30
KC0SKM EN42 Q65 Sent: -24 Rcvd: -30
N0LNO EN42 Q65 Sent: -24 Rcvd: -27
K5DOG EM00 Q65 Sent: -24 Rcvd: -21
VE6TA DO33 Q65 Sent: -19 Rcvd: -17
W5LUA EM13 Q65 Sent: -21 Rcvd: -21
WA3RGQ EL98 Q65 Sent: -23 Rcvd: -27 1st FL to HI

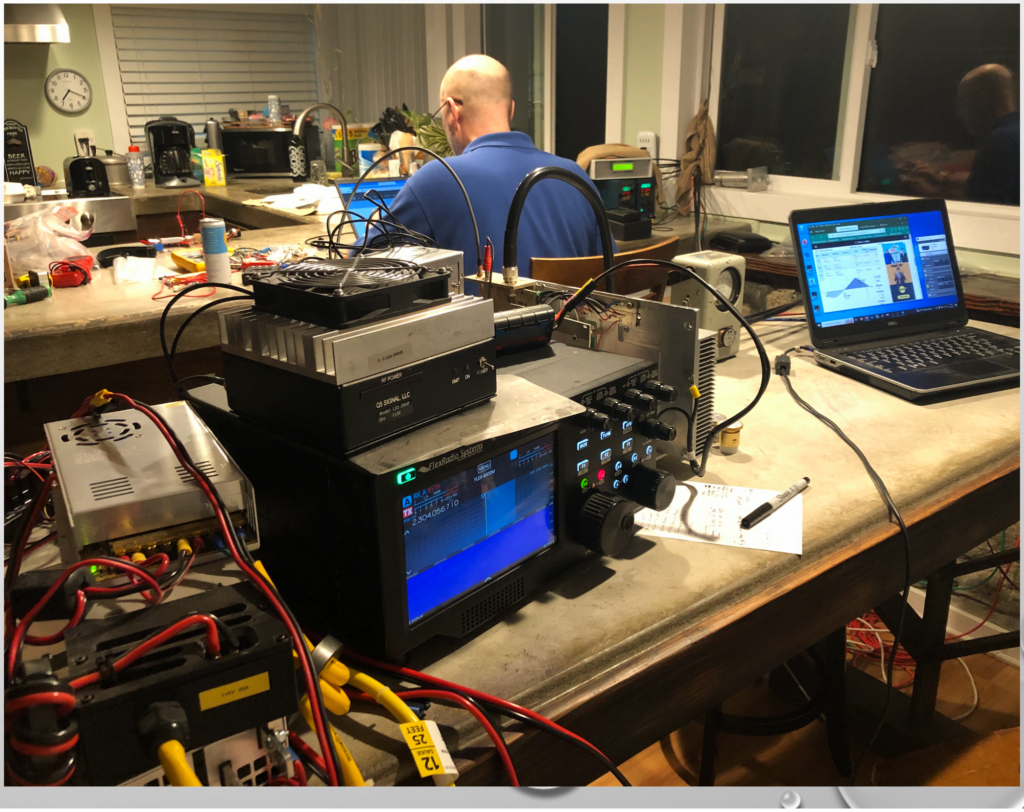
GEAR TO GET N1V ON THE AIR YEAR 3

- Bands:
  - 902
  - 1296
  - 2304
  - 10 GHz

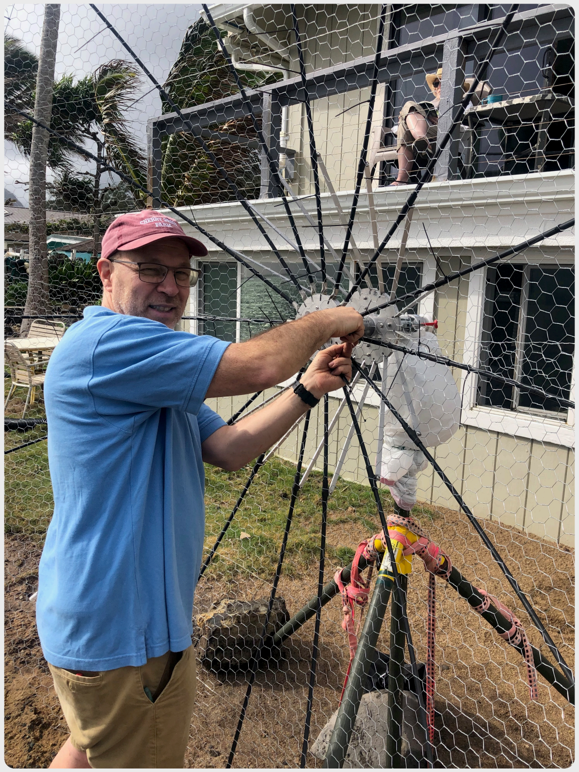
360# of gear on plane. Another 60# by mail.

WE ADD 2304 AND 10GHZ !

- Year three W2HRO brought 10 GHz
- We took up more of the kitchen
- I Added 2304/2320 to the setup
- Weather was very wet and windy most mornings during our MR.

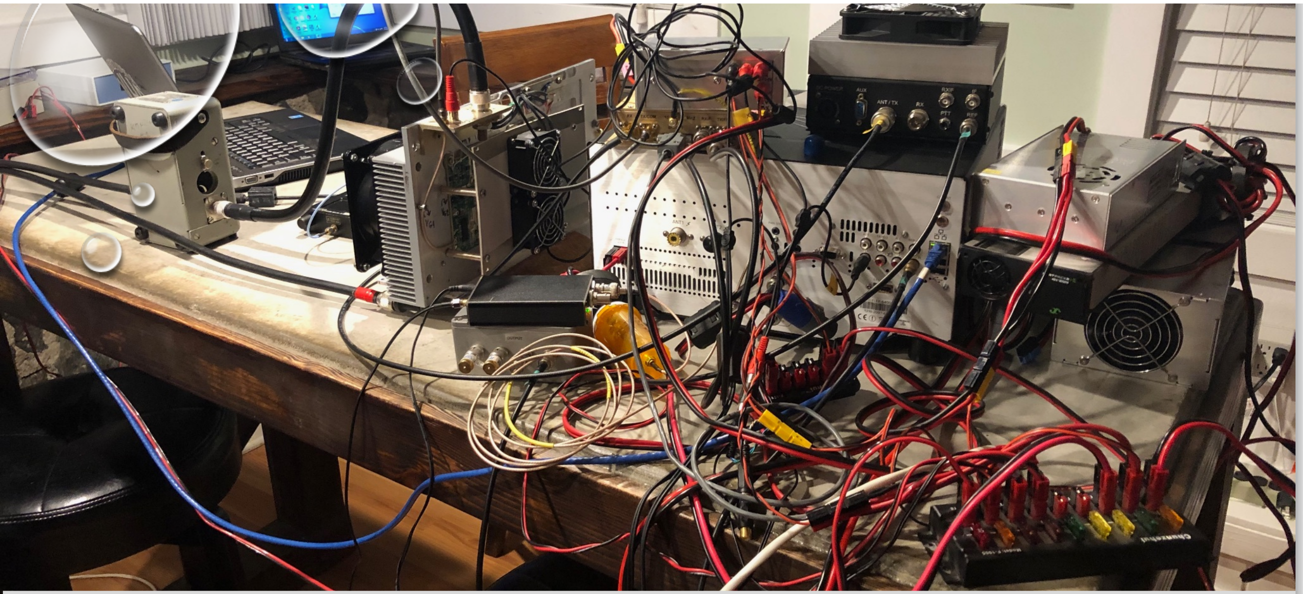


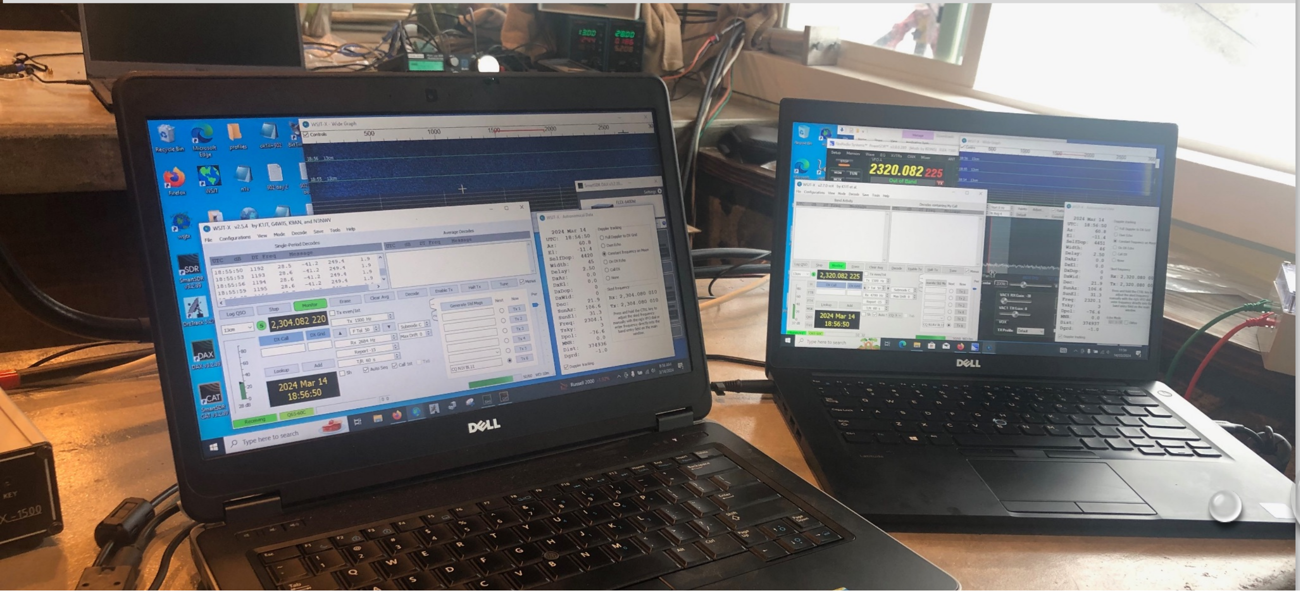
VERY STRONG WIND AND RAIN



- Had to Remove the fabric on the dish due to wind (25-30MPH)
- Trip to Ace hardware store for chicken wire mesh, to reduce wind load on the dish. (902/1296 MHz)

MOST EARLY MORNINGS

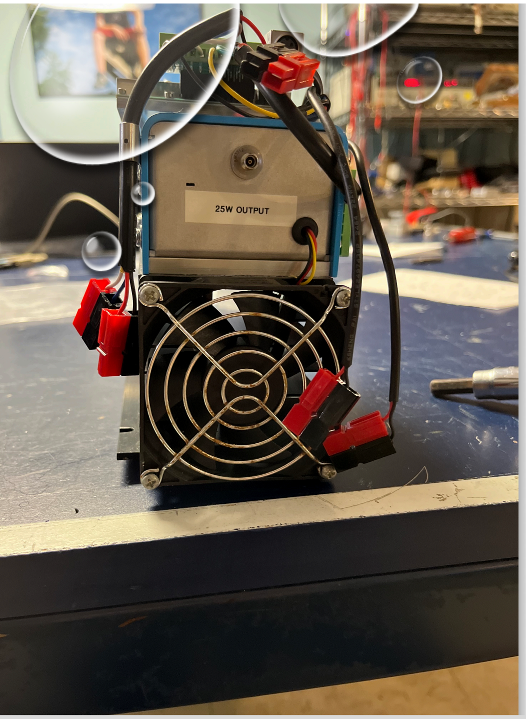


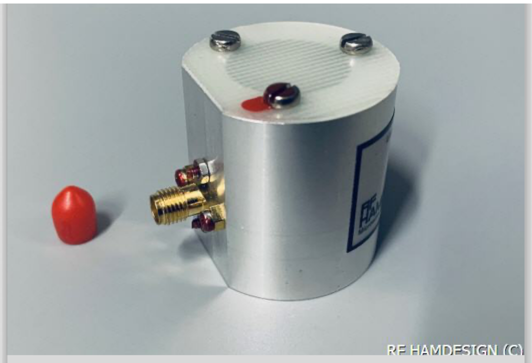


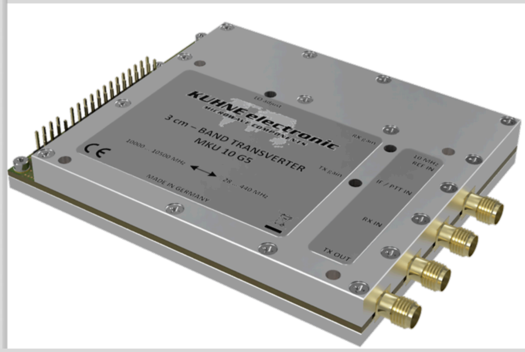
2304/2320 SETUP

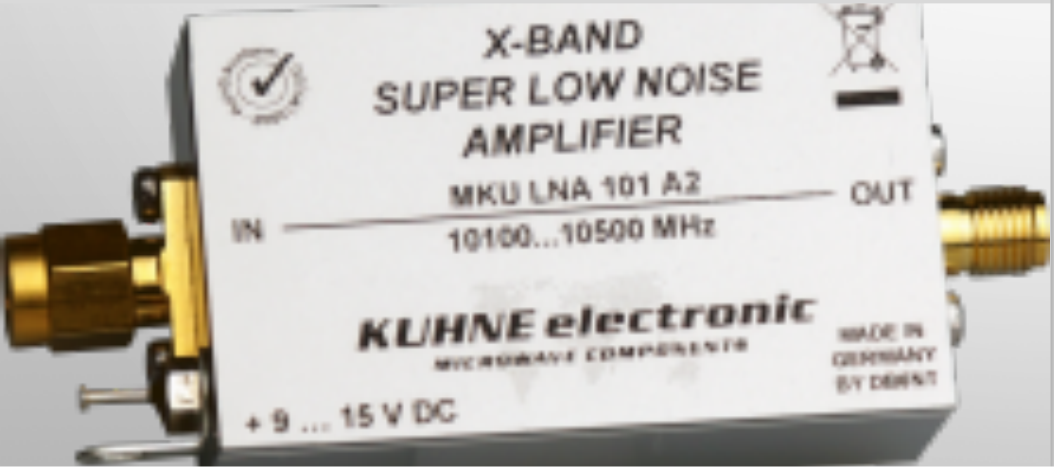
- **2304 Only**
- New design DEM Mini Transverter (modified for use with the flex)
- Flex 6400M
- Several LNAs (DEM with filter and KL6M
- An OK1 designed PA

- **2320/2304**
- I Included a mini-circuits splitter in the RX IF line
- 2304 was on the flex 6400 & laptop 1
- 2320 was on the flex 1500 & laptop 2
- I could TX/RX on 1st laptop on 2304 (with CFOM on)
- I could RX (only) on 2320 on the 2nd laptop (with CFOM on)



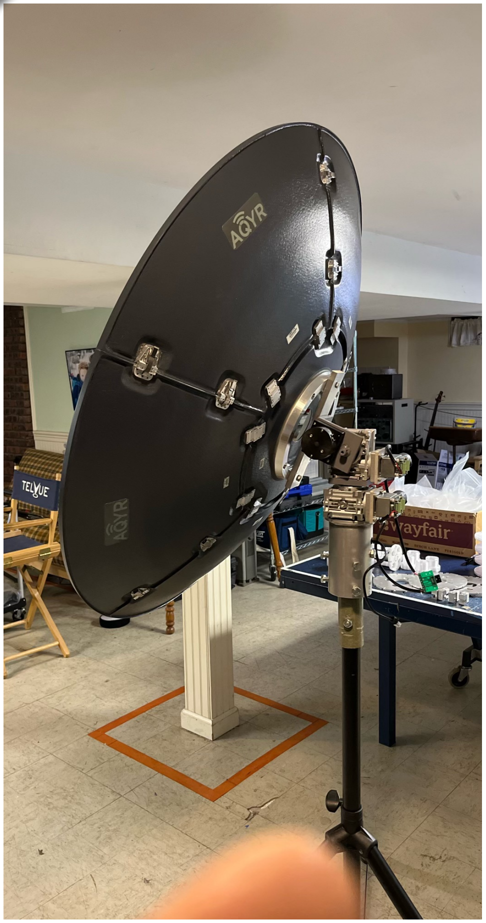


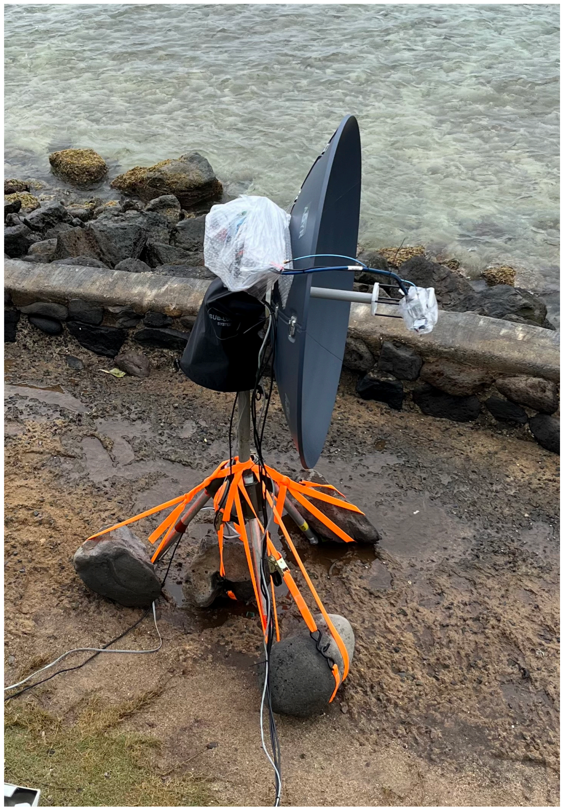




N1V'S 10 GHZ SETUP

- FIRST EVER "Serious" 10 GHz Activation from Hawaii
- RFHamDesign 10GHz linear feed
- Khune 10 GHz preamp
- Khune G5 transverter
- Texas Microwave 20w PA
- All SMA based





10GHZ SETUP

- Everything mounted on the back of AQYR section 1.1m (40") dish
- 28 MHz IF routed back to the op position.
- 3d printed feed holder *(printed the night before leaving for Hawaii)*
- Upgraded SL1 rotor (used US Digital Absolute encoders .1 degree)
- Secured with 150# of lava rocks

N1V YEAR 3 WORKED LIST

- **1296 Q65 60C**

  K5DOG (-19), FG8OJ 1ST EVER KH6 TO FG (-22), N5TM (-20), AA4MD (-17), VK4CDI (-23), K5DN (-16), OK2DL (-17), G4YTL (-19), SM5DGX (-17), G0LBK (-18), OE9ERC (-13), OH3LWP (-22), DL1AT (-22), PA3FXB (-22), NX9O (-25) (2.4M SUB LUNAR TO 2.4M SUB LUNAR DISH), G4CCH(-15), DF2VJ (-25), VE6TA (-15), KB2SA (-25), N0AKC (-28), KB2SA (-18), DL8FBD (-23) STATE #50 FOR WAS, OK1UGA (-14), DJ2DY (-22)

  2304/2320

  OK1DFC (-11), OE9ERC (-15), OK1KR (-25), W5LUA (-23), IK3COJ (-19) FIRST ITALY STATION TO WORK KH6 ON 13CM, PA3DZL (-17) FIRST STATION FROM THE NETHERLANDS TO WORK KH6 ON 13CM, PA0BAT (-19), OE9ERC (-14)

N1V YEAR 3 TOTAL WORKED LIST

- **902 MHZ**
- W6TCP (-21) FIRST EVER CA TO HI ON 902 MHZ
- K0DSP (-23) FIRST EVER NE TO HI ON 902 MHZ
  FIRST 2.4M SUB-LUNAR TO 2.4M SUB-LUNAR
- W7JW (-19) FIRST EVER MI TO HI ON 902 MHZ
- WA3RGQ (-17)
- N0AKC FIRST EVER WI TO HI ON 902 MHZ
- N1AV (-22) first EVER AZ to HI on 902 MHz
- N7GP (-26)
- W5LUA(-18)
- W2HRO (-16) first EVER NJ to HI on 902 MHz

N1V'S 10 GHZ WORKED LIST

- 2nd – 11th FIRST EVER QSOs from Hawaii on 10 GHz EME.

- W7CJO (-9)
- DL3WG (-19)
- OK1KIR (-22)
- PA3DZL (-21)

- OK1DFC (-24)
- OZ1LPR (-18)
- F4VTA (-25)
- PA0BAT (-18)
- F5VKQ (-21)
- W5LUA (-18) (2nd QSO *with KH6*)

ANY QUESTION?

N1V TO RETURN TO KH6 IN 2026
13 CM, 6CM, & 3CM